Space Weather Forecast

Issued on Sunday, 04 February 2024 at 13:19 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate flares likely throughout, with a slight chance of Strong flares. Chance of Minor Geomagnetic Storm on Sunday 04 February due to a possible glancing blow from a Coronal Mass Ejection (CME) combining with coronal hole fast wind arrival.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate over the past 24 hours, with one Moderate-class flare peaking at 04/1153UTC from the newly emerged sunspot on the southeast limb. There are currently eight numbered sunspots on the visible disc and one new unnumbered spot. A region in the southwest remains the largest and most magnetically complex, and has continued to show some minor growth in recent hours. The newly emerged sunspot close to the southeast limb looks to be large, although is currently difficult to analyse due to its current location. The new unnumbered spot is small and simple. All other spots have remained fairly stable or have decreased in size. No Earth-directed have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds were reflective of a slow solar wind regime for the majority of the period, with solar wind speed at background levels. The magnetic field was weak for most of the period, with only weak variation in the important north-south component.

Since approximately 04/1015UTC there has been a change, with an increase in solar wind speed to slightly elevated levels around 400km/s, and more moderate magnetic field, with the north-south component increasing. This may be due to a glancing blow from a CME, or interaction with a coronal hole fast wind but this is still uncertain.

The net result of the above solar wind measures was provisionally Quiet geomagnetic activity throughout.

Energetic Particles / Solar Radiation: Solar radiation levels remain slightly elevated above background levels following the Moderate class X-ray flare on 29 Jan from a sunspot now several days onto the far side. This enhancement remains well below the S1/Minor Radiation Storm threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: Overall activity is most likely to be Moderate, with isolated Moderate flares likely and a slight chance of a Strong flare, most likely from the complex region in the southwest, but also from the newly emerged region close to the southeast limb.

Solar Wind / Geomagnetic Activity: A CME that left the Sun at 01/0743UTC may be delivering a glancing blow at the time of writing, or may be yet to arrive. There may be also be a fast wind enhancement from a coronal hole during this period. Geomagnetic activity is expected to be mostly Quiet through the period, but perhaps a chance of G1/minor storm should the fast wind from the coronal hole combine with glancing CME effects on day 1 (04 February).

Energetic Particles / Solar Radiation: High energy proton flux is expected to remain below the S1/Minor Radiation Storm level, with a daily slight chance of exceeding the S1 threshold.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	25	10	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	60	60	60	60
Very Active	R3 to R5 X	No	10	10	10	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	10	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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